Accelerator Systems Division Highlights Ending February 25, 2005

ASD/JLAB: Cold Linac

ASD/BNL: Ring.

This week we shipped the last (#8) Ring quad doublet assembly. This last doublet will be installed in the extraction straight section. The shipment also included the support frames, plates and brackets for two IPM chambers.

Next week you will receive two separate shipments from BNL:
Truck #1:

- IPM chambers #1 and #2.
- IPM computers and associated parts.
- The downstream extraction kicker assembly (K2).
- Spare Ring vacuum chambers.

Truck #2:

- Three 30Q58 quadrupole magnets.
- Three 30Q44 quadrupole magnets.

Coils for the 17D224 magnet arrived this week from Alpha Magnetics. The coils are being inspected and tested before being fitted into the magnet core. The core has been pre-surveyed and accepted.

17ELS224 - the extraction Lambertson septum magnet: bus work modifications were completed this week; water manifolds were fabricated and installed. Some plumbing changes are being made.

The vacuum chambers for the movable scraper (integral to the Ring primary collimator) and BIG were successfully coated (TiN) this week.

BNL/SNS staff attended a videoconference on the (final) design review of the RTBT/Target Interface presented by ASD's Mike Holding.

In our weekly teleconference with Fiber Materials, Inc. they reported that the BNL ordered foils are out of the oven and will be heading into their machine shop early next week. A final graft operation is expected to take between four to eight days (ready by ~ 3/10).

Five of the remaining twelve power supplies were delivered to SNS/OR by IE Power this week. We are told that the remaining seven should be shipped by March 31.

Final assembly work continues on:

- The K1 extraction kicker magnet assembly.
- 17D224 magnet assembly (core, coil, vac).
- 17ELS224 magnet assembly and measurements.
- 36Q85 quads – assembly underway in AGS high bay area.
- Movable scraper assembly.
- Injection Dump Septum (spare) (mag measure followed by vac assembly).
- Diagnostics (BPM, Video Foil Monitor and BIG).
- RTBT Q1/Q2 magnet assembly (mags, stand, vac).

An order has been placed for the stationary (outer) shielding for the Ring Primary Collimator.

As-built drawings for the Injection Thin Foil Stripper Assembly (chain-saw drive) are in final review before being released for fabrication (spare drive).

Mike Hemmer distributed a draft copy of his “SNS/BNL Injection Area Installation and Survey Data” paper for internal review and comments. When finished, it will be submitted through the SNS Document Control Center as SNS document number “SNS 105000000-TD 0005-R00”.

Controls

Work continued on the move of equipment from to the Central Control Room. The PPS console was installed, and wiring should be completed this weekend. The "northwest arc" console section was delivered to the CLO on Friday and may be installed this weekend. At the time this was written, the move of the ODH equipment was complete and certification testing was about to begin. Unfortunately the PPS certification (originally scheduled for Saturday) had to be rescheduled for Monday night due to some TPS work not being completed by Saturday. As it stands now, the control room should be ready to support RF conditioning of cryomodules next Tuesday night.

We scrambled to get communications equipment in the "installation frontier" of the Klystron Building ready for RF and power supply testing next week. We were still waiting for power in associated control racks as of Friday afternoon.

Recall 4 weeks ago there was an incident where one of the JLab Vacuum Control Chassis sustained damage due to an overcurrent condition: We have retrofitted fuses to the first 5 chassis to prevent this from happening again. The first four chassis are now back up and running (chassis MB1 – HB1). The fifth chassis (HB5) has been reinstalled but not turned on because we still are calibrating the AVIC cards.

JLab estimates that the damaged chassis could be repaired and returned as early as 3 weeks from now.

Derrick Williams traveled to JLab with others from ASD in order to review plans for handover of spare vacuum control hardware and vacuum system design documentation. There is still some work to be done by JLab to complete the documentation package. They have agreed to do this work and we expect to have a final documentation in a few weeks.

RF control software support included the following:
- Updated the Linac LLRF IOCs with latest code for the run planned for next week. Checked Channel Access security to verify that control screens still function properly when operated from the CLO.
- Worked with Hengjie Ma on tests and comparisons of the 'old' VHDL-based and the 'new' Verilog-based FCM support.
- Started to work on the RF test stand: One of Yoon's students wants to try some automation, and Mark Crofford wants to update some hardware.

Work continues on the LEBT/MEBT Chopper Controller board design and schematic. Equipment cost and labor estimates of design options for the Active Damper project were provided.

Installation

Craft Snapshot 2/15/05

ASD productive craft workers	**73.0**
Foremen (Pd by 15% OH)	6.0
AMSI management (Pd directly)	3.0
TOTAL AMSI WORKERS	82.0
Less WBS 1.9, 1.2 etc	**5.0**
Less absent	**3.0**
TOTAL PD BY ASD/ORNL DB WPs	**65.0**

Accelerator Physics

Good progress was made this week on adding HEBT, Ring, and RTBT magnet excitation curves and multipole data to the database.

Two quadrupole magnets in the HEBT, near the personnel maze, will be rotated 180 deg. to make more room for personnel.

The revised Ring/Target Interface Control Document has been fully signed off. It will be in ProjectWise soon.

Operations

Began the transition from the temporary Front End Control Room to the Central Control Room in the CLO.

Moved and recertified the ODH system for the Linac Tunnel.

Continued work with the Transition to Operations Working Group on the re-write of the SNS Conduct of Operations And began the re-write of the ASD Operations Procedures Manual for the entire SNS

Ion Source

Both Allison emittance scanners on the ion source hot spare stand have been equipped with the redesigned entrance slit, which should eliminate any slit scattering.

The hot-spare stand has been equipped with a new, water-cooled Faraday cup.

Lens 2 on the hot spare stand is being modified in preparation of the chopper tests.

Survey and Alignment

.**Mechanical**

This week we finished mapping the last of the SCL 8Q35's; 66 in all including one spare. We have warm sections installed from MB03 through HB06, HB13 through HB18 and HB21. HB06, HB19 and DB20 are ready to install. That leaves eight warm sections to assemble. I have chosen doublet pairs for these warm sections and we will continue with assembly. We have mapped three RTBT 21Q40's with the fourth on the measurement stand.

Ring Systems Installation

- The HEBT Labyrinth Shield Wall construction was started.
- The Ring Injection straight section Chicane Magnet #2&3 support stand was installed.
- The Ring Injection straight section Chicane Magnet #4 was installed.
- The Ring Injection straight section Doublet Magnet stands (2) stands were aligned and grouted.
- The Ring Injection straight section upstream Kicker Magnets (2) stands were aligned and grouted.
- The Ring Collimator straight section Doublet Magnet stands (2) were aligned and grouted.
- The Ring Extraction straight section downstream Doublet Magnet was received and staged for installation.
- The Ring RF straight section RF Cavity stands (2) were aligned and grouted.
- The Ring RF straight section Doublet Magnet stands (2) were aligned and grouted.
- The Ring RF straight section IPM Diagnostics support stands were received and staged for assembly.
- The installation of the HEBT vacuum gauging continued.

Water Systems Installation

- Installation of the Linac SCL Cryo Warm Section Magnet cooling connections continued.
- Installation of the Linac SCL Cryo Warm Section PS cooling systems continued.
- Installation of the HEBT Collimator closed loop cooling system continued.
- Installation of the Ring SB PFN cooling system manifolds continued.

- Installation of the Ring Tunnel Arc Magnet cooling connections continued.
- Installation

Electrical Group

Working on cable terminations for SCL modules HB-8, HB-9, and MB-2 and warm section terminations in the linac tunnel.

Linac Klystron Gallery:

- SCL ME-6 area – ac power installation, cable terminations in progress
- SCL ME-7 area – cable pulling and rack installation, ac power installation, cable terminations in progress
- SCL ME-8 area – ac power terminations, diagnostics and vacuum cable pulls and terminations in progress

Ring service building: AC power terminations for RF systems, PPS wiring, and rack installation in progress. Installing racks and trays in kicker power supply area. Cable tray installation in PFN building.

RTBT Tunnel and Building: Cable tray installation in tunnel complete. Started ac power installation in RTBT building.

Completed integrated magnet/power supply/controls testing for SCL warm section 15 (HB-4), bringing the completed warm section integrated magnet/power supply/controls tests to 13 of 34. SCL warm section 16 (HB-5) integrated magnet/power supply/controls testing started this week.

Completed integrated magnet/power supply/controls testing for 4 HEBT power supplies: HEBT_MAG:PS_QD11, LDmp_MAG:PS_QH01a05, LDmp_MAG:PS_QV02 and LDmp_MAG:PS_QH03a06. This beings the number of completed HEBT integrated magnet/power supply/controls tests to 12 of 22.

Five 1300 A, 95 V HEBT/Ring /RTBT medium magnet power supplies were delivered this week, bring the total delivered on this procurement to 70 of 77. The seven remaining supplies are scheduled for delivery in one month.

Modulators/Pulsed Power:

- SCL ME6 installation complete. Integrated test/checkout started.
- SCL ME7 installation started.

Installed upgraded switching transistors in LEBT choppers.

HPRF

SCL transmitters 15 and 17 wiring/terminations are complete. AC power is available at Xmtr-15 and that PLC has had its operating software installed.

Extra resources have been applied to SCL Mod 18 and 21 to pull the schedule forward by one month. Progress is good.

RFTF cryo-coupler testing of the doorknob transitions continue. About three weeks of work remain.

Ring RF System; AC power connection is about 40% complete.

LLRF

Cryo Group

Operation of the CHL 2.1 K cold box was tested. Operation of the back fill and pump down sequences was further refined. The transfer line and 14 cryomodules were cooled to ~2 K for more than an hour. The variable frequency

drive cabinets for cold compressors 3 and 4 were operated with additional forced air cooling. This helped to keep the transformer temperature lower, but the transformers still became too hot. The run was terminated when the transformer reached its maximum operating temperature.

Beam Diagnostics

BPM:

MB03-MB11 and HEBT installed and connected in the tunnel
HB06-HB21 awaiting pull and DB termination of cables
Training session to learn BPM phase matching completed

Loss monitors:

Ion Chambers received and calibration in process
MB03-HB3 and HEBT cables installed
BLM test stand: done
BLM IOC: Andrei taken over all development, BNL BLM frozen
MB03-HB3 and HEBT mounting brackets installed
HB4-HB21 long haul cable pulls in progress

Laser systems

MB01 (LW01) and MB02 (LW02) have been wired and tested and are ready for installation on warm sections
MB03 (LW03) and MB04 (LW04) are installed and have been function tested through the long haul cables
HB01 (LW12) through HB04 (LW15) tunnel connections in process
HB21 (LW32) long haul cable termination in process

Timing/Reference

Received first shipment of production circuit boards. They will go to manufacturer next week.
Determined that optical amplifier should be installed near the end of SCL. The layout will be updated and reviewed next week.

SCL Installation

Racks complete through row 15 (8 of 20)
Rack prep in progress for remaining 12 racks

HEBT Installation

Rack prep complete in HEBT
HEBT cabling complete except LW32 and Laser Stripping experiment
LW32 terminations in progress

Software

Laser Profile Monitor: Igor working on LV program.
Timing Card: Lower library functions done
Ch0: No budget as of yet
Harp: Compact RIO setup in progress
WS: parts for test (400ft, motor with NI drive) being ordered
RBPM: received code from Chris, adding PVs.
Platform: Dynamic ctl replacement code received from NI, evaluating.

Configuration/PCs

Updated Database
Installed and did initial look at MOM2005. Surmised that it is too much work for right now.
Ordered 2 Video Cables.
Moved DiagTS to the CER and set up.
Began effort of web access to documentation.